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A NEW SPECIES OF *NEOLASIOPTERA* (DIPTERA: CECIDOMYIIDAE) FROM *BACCHARIS* (ASTERACEAE) IN SOUTHERN UNITED STATES AND THE DOMINICAN REPUBLIC

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Abstract.—A new species, ***Neolasioptera rostrata*** Gagné (Diptera: Cecidomyiidae), which galls flower receptacles of several species of *Baccharis* (Asteraceae), is described and illustrated. It is known from Maryland, Florida, Texas, and New Mexico in the USA, and from the Dominican Republic. A field study in Texas showed that *N. rostrata* has two generations per year and that overwintering larvae diapause from November to the following September.

Key Words: gall midges, *Baccharis*, saltwillow

A new species of gall midge, *Neolasioptera rostrata*, is described that forms a gall in the receptacle of male and female flowers of several species of *Baccharis* in Maryland, Florida, Texas, and New Mexico, and the Dominican Republic. The life history of *N. rostrata* was studied on saltwillow, *Baccharis halimifolia* L. (Asteraceae: Astereae), in Texas. Saltwillow is a woody, perennial, dioecious shrub (2 to 3 m ht), that grows from Texas to Florida and north to New York (Tarver et al. 1979). This shrub invades pastures, rangeland, and fallow fields (Hardin 1959), but may be toxic for cattle (Kingsbury 1964, Manley et al. 1982). It is currently being studied in Texas as a potential target for biological control (DeLoach et al. 1986).

Materials and Methods

Anatomical terminology in the species description follows the Manual of Nearctic Diptera (McAlpine et al. 1981). Some specimens were permanently mounted in Canada balsam on slides. The specimens used for the description have been deposited in the National Museum of Natural History (USNM), Washington, D.C.

The field study of *N. rostrata* in Texas was part of a general survey of the phytophagous insect fauna of *B. halimifolia*. Observations were made on three established plots, one to two ha each, in abandoned pastures at Waller, Waller Co., and Port Lavaca, Calhoun Co., and along three kilometers of roadside ditch at Indianola, Calhoun Co., Texas. Each plot contained 50 to 100 plants of *B. halimifolia*. Flowers were sampled at about two week intervals from September 14 to November 10, 1987. At each plot, two to four stems were removed from 10 male and 10 female plants and bagged. Sample stems grew one to two m above the ground and bore 50 to 100 flowers. In the laboratory, each field sample was divided into four groups, and 25 flowers from each group were removed without bias for dissection. The number of galled flowers

and the presence of larvae, pupae, and parasites were recorded. Galls collected on November 10 at Port Lavaca were measured in cross-section at 100× with a calibrated ocular micrometer in a stereo microscope. The plots were inspected monthly from December, 1981 to February, 1988, but few flowers were collected because they did not remain on the plants.

In addition to the foregoing collections, large numbers of infested flowers of *B. halimifolia* were collected between October and December, 1986 at Conroe, Montgomery Co.; Liberty, Liberty Co.; and Monroe City, Chambers Co., Texas. Some flowers were dissected; others were held for emergence of adults. On July 10, 1986, a collection was made of infested flowers of *Baccharis neglecta* Britt. at Fort Leaton, Presidio Co., Texas.

Neolasioptera rostrata Gagné, New Species

Adult.—Scale color pattern: frons white; posterior surface of head and all of scutum brown; legs white ventrally, brown dorsally; leading edge of wing brown except for white spot at juncture of R5 and costa; anterior half of tergites 1–7 brown, posterior half silvery-white. Antenna with 11 flagellomeres in ♂ (n = 10) (Fig. 5), 12 in ♀ (n = 10). Mouthparts (Figs. 4, 5): labrum long-attenuate; labellum elongate, broadly rounded at apex, second segment more than 3 times as long as first; palpus 4-segmented. Thoracic vestiture: scutum with dorsocentral and lateral rows of setae, covered elsewhere with scales; anepisternum with scales on dorsal half to two-thirds; katepisternum bare; anepimeron with 9–12 setae and 0–2 scales. Wing length: ♂, 1.2–1.6 mm (n = 10); ♀, 1.4–1.6 mm (n = 10). Length R5 to remainder of wing: ♂, 0.55–0.60; ♀, 0.54–0.57.

Male abdomen (Figs. 7–10): Tergites 1–7 short, with single row of setae along entire posterior margin, covered elsewhere with scales; tergite 8 short, unsclerotized and without scales on mesal third, sclerotized and covered with scales on lateral third. Sternites 2–6 with setae inside periphery, scales elsewhere; sternites 7–8 short, with setae posteriorly only, scales elsewhere. Genitalia as in Figs. 8–10, setulae on gonostylus extending to midlength on venter.

Female abdomen (Fig. 6): Tergites 1–6 longer than in ♂, vestiture as in ♂; tergite 7 less than half width of 6, double row of setae present along posterior margin, scales present on posterior half; tergite 8 approximately twice length of tergite 7, longitudinally divided except near anterior end. Sternites 2–7 similar to 1–6 of ♂, sternite 8 slightly shorter than the preceding, its setae scattered across sclerite; tergite 6 is 0.21–0.23 length of distal half of ovipositor (n = 10).

Last instar.—Length, 1.5–1.7 mm (n = 10). Integument pebbled. Spatula (Fig. 2) anteriorly with 2 triangular lobes. Papillae: three laterals on each side of spatula, two with short setae, one without; inner pleurals without setae on prothorax, with setae on remaining segments; four terminals on anal segment (Fig. 1), each with short seta; remainder characteristic of genus but setae short.

Specimens examined.—Holotype: ♂, FLORIDA, Dodge I., Miami, emerged XI-1970 from seedheads of *Baccharis glomeruliflora*, collected XI-1970, C. E. Stegmaier, Jr. Paratypes: FLORIDA: 1 ♂, same data as holotype. MARYLAND: 6 ♂, 6 ♀

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Figs. 1–10. *Neolasioptera rostrata* (1–2, 4–10) and *N. lathami* (3). 1, Eighth and anal larval segments. 2, Spatula and associated papillae. 3–5, Heads, 3, 5 in frontal view, 4 in side view. 6, Female postabdomen. 7, Male abdominal segments 5–8. 8, Male genitalia (one gonopod shown). 9, Male genitalia, lateral view. 10, Gonostylus. Scale line for Figs. 1–5, 8, 9 = 0.10 mm; 6, 7 = 0.05 mm; 10 = 0.01 mm.


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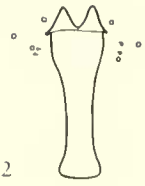
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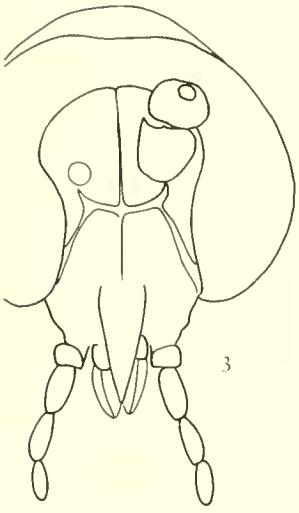
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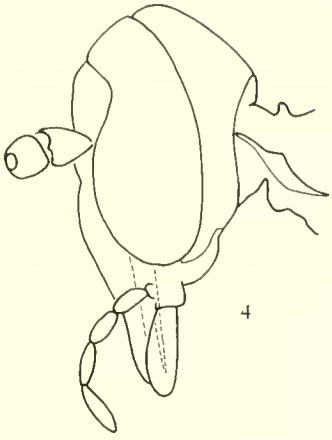
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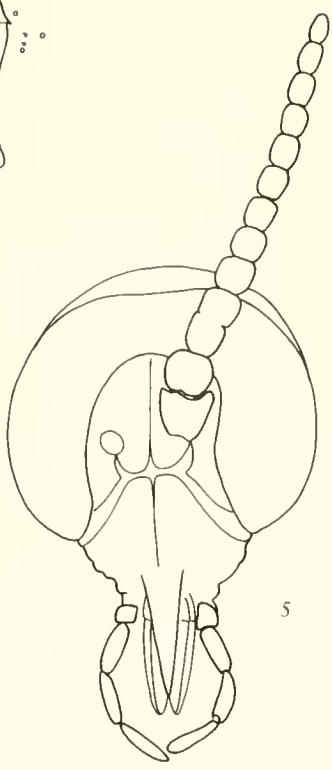
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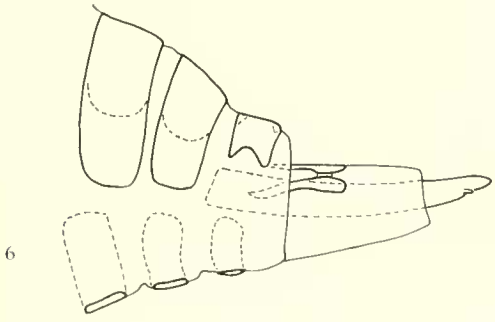
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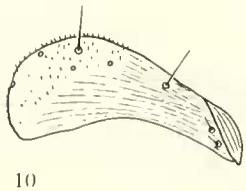
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Fig. 11. *Baccharis halimifolia.* Left, flowering branchlet and leaf, 1×. Center, flower heads, one in sagittal section to show receptacle swelling, 2×. Right, flower in sagittal section to show swollen receptacle and curled larva, 6×.

Talbot Co., emerged VIII 1985 from flower heads of *Baccharis halimifolia,* collected X-1984, V. Krischik. NEW MEXICO: 2 last-instar larvae, 4 mi. e. Loving, Eddy Co., from flower heads of *Baccharis salicina,* T. O. Robbins. TEXAS: 3 ♂, 3 ♀, Ft. Leaton St. Pk., Presidio Co., reared from flower receptacle galls on *Baccharis neglecta,* collected VII-10-1986, T. O. Robbins; 10 last-instar larvae, Indianola, Calhoun Co., from flower receptacle galls on *Baccharis halimifolia,* XI-10-1987, P. E. Boldt; 1 ♂, Liberty, Liberty Co., Hwy U.S. 90, from flower receptacle galls on *Baccharis halimifolia,* X-10-1986, P. E. Boldt; 1 ♀, Port Lavaca, Calhoun Co., from flower receptacle galls on *Baccharis halimifolia,* X-28-1987, P. E. Boldt; 1 ♂, 1 ♀, Waller, Waller Co., reared X-11-1986 from flower receptacle galls on *Baccharis halimifolia,* collected XI-1987, P. E. Boldt. DOMINICAN REPUBLIC: 5 ♂, 4 ♀, road from Constanza to San Jose de Ocoa, Prov. La Vega, emerged VII-1987 from flowers of *Baccharis myrsinites,* collected VII-17-1987, A. L. Norrbom.

Distribution.—Maryland on *Baccharis halimifolia*; Florida on *B. glomeruliflora*; Texas on *B. halimifolia* and *B. neglecta*; New Mexico on *B. salicina*; and Dominican Republic on *B. myrsinites.*

Remarks.—Adults of *N. rostrata* are similar to those of *Neolasioptera lathami* Gagné, which causes stem galls on *Baccharis* spp. from New York to Texas (Gagné 1971). The

Table 1. Mean percentage (±SD) of galls of *Neolasioptera rostrata* in male and female flowers of *Baccharis halimifolia* at three locations in Texas, 1987.

Date	Waller		Port Lavaca		Indianola	
	Male	Female	Male	Female	Male	Female
September 24	0	0	8.0 ± 3.2	0	8.0 ± 11.2	0
October 14	1.0 ± 2.0	0	5.0 ± 3.6	16.0 ± 8.6	5.0 ± 5.2	2.0 ± 2.4
October 28	35.0 ± 11.4	30.0 ± 8.3	20.0 ± 7.3	6.0 ± 7.6	51.0 ± 8.4	12.0 ± 8.9
November 10[a]	—	11.0 ± 6.0	—	10.0 ± 9.4	—	32.0 ± 10.8

[a] No male flowers remaining on plant.

principal difference between adults of these species is the length of the mouthparts. The labrum and labella of *N. rostrata* are very long, reaching almost to the distal end of the outstretched third palpal segment (Figs. 4, 5). The labrum and labella of *N. lathami* are similar to those of other neolasiopteras and reach only to the distal end of the second palpal segment (Fig. 3).

Larvae of both *N. rostrata* and *N. lathami* have three lateral thoracic papillae, two with setae and one without on each side of the spatula. The inner pleural prothoracic papilla, slightly lateral to the group of lateral papillae, has no seta in *N. rostrata* (Fig. 2). Further, *N. rostrata* has four terminal papillae (Fig. 1) instead of the six found in *N. lathami*.

Biological Notes

Neolasioptera rostrata produces an enlargement of the receptacle of either male or female flowers of *B. halimifolia* (Fig. 11). The gall is usually single-celled with one single larva. Two of the 227 galled flowers dissected during this work contained two larvae, each in its own cell and separated from the other by a thin wall. The full-grown larva is curled in a circle and fills the chamber. The gall in the receptacle is not apparent externally until the mature larva pushes the top of the gall into a conical shape and forms an exit hole at the apex. The hole is then covered with a silky membrane presumably produced by the larva. The larva then pupates or diapauses. Fifteen galls measured 0.69 ± 0.12 mm wide by 1.06 ± 0.20 mm high ($\bar{x}$ ± SD).

The development of the midge is closely related to the bud and flower development of its host. In Maryland, adults emerged in August and September, 1984 from flowers collected in October of the previous year. Emergence coincided with normal flowering of *B. halimifolia* in Maryland. In 1987, galls were first observed in Texas on September 24, in male flower buds at two of three locations (Table 1). Male flowers were probably attacked first because they developed sooner and were larger than female flowers. Pupae were present in both male and female flowers on October 14 at Port Lavaca. Empty galls, indicating previous adult emergence, were found on October 28, the only sample date when *N. rostrata* was present in both male and female flowers at all plots.

Of 600 senescent or blooming flowers sampled, 151 contained galls (25.2% infestation). The actual infestation rate was probably smaller because most of the senescent flowers had already dropped from the plant by that date and were uninfested. Of the 151 galls, adult midges had emerged from 37. Eight others contained pupae, nine contained small larvae, and 97 contained medium or large larvae. The presence of galls in the receptacles did not appear to affect pollen or seed production. Adult emergence in late October indicated the probability of a second generation. The small larvae present at that time were probably the progeny of the last adults of the first generation to oviposit.

On November 10, all male flowers had dropped, but some senescent female flowers remained on the shrubs. Of the 300 flowers sampled, 53 were galled (17.7% infestation) and contained medium to large quiescent larvae. Only a few empty galls or galls containing larvae were found in each of the following months through February, 1988 when sampling was discontinued.

One species of *Tetrastichus* sp. (Eulophidae: Hymenoptera) was found feeding externally on a larva collected October 28, 1987 at Port Lavaca. Another was reared from a pupa and from galls collected October 10, 1986 at Liberty. *Platygaster* sp. (Platygasteridae) was also reared from galls collected October 10, 1986, at Liberty, Texas.

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1–10; V. Krischik, A. L. Norrbom, T. O. Robbins, and C. E. Stegmaier, Jr. collected specimens of the new species; M. E. Schauff identified the Hymenoptera; and D. R. Ferguson, K. M. Harris, V. Krischik, W. A. Palmer, and R. V. Peterson reviewed a draft of the ms.

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